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REPORT
CD NO.

50X1-HUM

COUNTRY	USSR	DATE OF INFORMATION	1953
SUBJECT	Economic; Technological - Machine tools; high-speed methods	DATE DIST.	17 Aug 1953
HOW PUBLISHED	Daily newspapers, monthly periodical		
WHERE PUBLISHED	USSR	NO. OF PAGES	4
DATE PUBLISHED	16 Apr - May 1953		
LANGUAGE	Russian	SUPPLEMENT TO REPORT NO.	

THIS IS UNEVALUATED INFORMATION

SOURCE Newspapers and periodical as indicated.

HIGH-SPEED METHODS ON SOVIET MACHINE TOOLS

DEPUTY MINISTER OF MACHINE BUILDING GIVES SPEECH -- Moscow, Vechernyaya Moskva, 20 May 53

A meeting of Stakhanovites of the Moscow metalworking industry was held on 19 May. Kostousov, Deputy Minister of Machine Building USSR [former Minister of Machine Tool Building USSR], gave a speech on the obligations of workers of the machine building industries to apply more extensively the latest achievements in the field of metal cutting.

Although labor productivity has increased by 8-12 percent as a result of using high-speed cutting alone, there are still some enterprises in Moscow where the work of innovators is not being sufficiently studied and applied. Among these enterprises is the Second State Bearing Plant (Bakhvalov, director) and the Internal Grinding Machine Plant (Tsukanov, director). The number of high-speed workers at the Machine Tool Building Plant imeni Ordzhonikidze has not increased during the past 6 months.

SHOW INCREASE IN MACHINE-TOOL SPINDLE SPEEDS -- Moscow, Vestnik Mashinostroyeniya, May 53

The spindle speed of many Soviet machine tools has been increased in recent years. For example, the 1948 Model 1D62 had a maximum spindle speed of 600 revolutions per minute, whereas the similar 1949 Model 1A62 now has spindle speeds up to 1,600 revolutions per minute; the spindle speed of the Model 1325 turret lathe was 1,380 revolutions per minute, whereas the Model 135A has spindle speeds up to 2,450 revolutions per minute; the Model 262G horizontal boring machine had speeds up to 750 revolutions per minute, whereas its modernized version has speeds up to 1,000 revolutions per minute.

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DESCRIBE HIGH-SPEED METHODS AT SECTION OF MACHINE-TOOL PLANT -- Minsk, Sovetskaya Belorussiya, 16 Apr 53

Lathes and milling machines have been modernized at one section of the Moscow Machine Tool Building Plant imeni Ordzhonikidze by changing electric motors and pulleys and replacing flat belts with V-belts. As a result, the spindle speed of a Krasnyy Proletariy 1D20 lathe has been increased from 650 to 900 revolutions per minute; the Model 1A62 from 1,200 to 1,450 revolutions per minute.

In converting the section to high-speed machining methods, it was also necessary to use cutting tools with hard-alloy tips.

In chucking operations, a cutting tool with a [normal] side rake of 16 degrees and a flat 0.2 millimeter wide with a negative rake of 5 degrees was used at the section. In machining a part between centers, a cutting tool with VK2 tips was used, making it possible to increase the cutting speed 25-30 percent.

End milling was done with milling cutters 90-250 millimeters in diameter with inserted hard-alloy blades. It was established that milling cutters with a large number of teeth operate more smoothly and quietly than milling cutters with a small number of teeth.

Plating certain parts of high-speed-steel tools with hard alloy by the electric spark method is being used widely at the plant. This is effecting a considerable saving in manufacturing costs.

The cutting of worm and trapezoidal threads is now being done on 1A20 lathes with special hard-alloy cutting tools. Threads with small pitch are cut in one operation; worm threads are cut in two operations at a cutting speed of 125 meters per minute and a depth of cut of 1-2 millimeters which decreases gradually to 0.2 millimeter.

Final machining of holes in steel parts, previously done with shell reamers and counterbores, is now done by a special swinging arbor with two inserted hard-alloy cutters. The cutting speed has now increased from 6-7 to 180 meters per minute and productivity has increased four to six times.

Most operations in milling keys are now performed on vertical milling machines with milling cutters on which hard alloy has been deposited by the electric spark method.

For example, the conversion from milling 12-millimeter keys with high-speed-steel mills to machining them with hard-alloy plated mills has increased the cutting speed from 17 to 445 meters per minute.

The application of high cutting speeds on lathes, milling, and drilling machines led to a bottleneck in finishing operations. The problem of high-speed grinding was soon solved by Soviet scientists in cooperation with production workers. The All-Union Scientific Research Institute of Abrasives and Grinding developed new high-speed abrasive wheels with a ceramic bond and of increased strength.

The introduction of high-speed grinding required the modernization of existing grinding machines. To solve this problem, the diameter of pulleys was changed, making it possible to increase the grinding-spindle speed from 1,020 to 1,620 revolutions per minute.

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It was also found that in high-speed grinding, the electric motor had to be replaced by a more powerful one.

The production of grinding wheels, more than 600 millimeters in diameter, was mastered at the end of 1951. A grinding wheel designed by Voronov, engineer, consists of a metal faceplate with equally-spaced steel segments screwed into it. These segments have abrasive material glued on them.

The advantages of such a grinding wheel are that it is considerably lighter than an ordinary solid grinding wheel, puts less load on the sleeve bearings, and makes full utilization of the adherent abrasive.

In addition to increasing machining speeds, a great deal of attention has also been given to shortening handling time, effectively organizing the worker's area, and providing the worker's area with tools.

Sixteen Stakhanovite sections using high-speed methods of metalworking have been created at the Moscow Plant imeni Ordzhonikidze for emulating the work of the section described above. -- A. Gonc'arov, Stalin Prize winner, senior foreman of the Moscow Machine Tool Plant imeni Ordzhonikidze

MORE ON KOLESOV'S METHOD OF POWER CUTTING -- Leningradskaya Pravda, 12 May 53

In March 1953, a complex brigade was created at the Leningrad Znamya Truda Plant to introduce Kolesov's power method of cutting at that plant. However, attempts to utilize cutting tools made according to Kolesov's design in machining parts processed at the plant were unsuccessful. After consultation with Petrov, a lathe operator, the /normal/ side rake of the tool was changed from 5 degrees to 12 degrees. The results exceeded all expectations. Not only was the cutting speed increased, but the life of the cutting tool as well. Whereas formerly the cutting tool had to be reground after machining three parts, it can now machine 16 parts without being reground.

Certain plant directors are apprehensive about using the power method of cutting because it might lead to rapid wear of the machine tools. These doubts have been allayed as a result of studies made by the ENIMS (Experimental Scientific Research Institute of Metal Cutting Machine Tools) on the utilization of lathes with large feeds. These data show that calculations and practical applications have established that operation with large feeds, on an overwhelming majority of models in the existing lathe park, is possible with minor modernization of the feed drive.

Tests conducted at the VNII (All-Union Scientific Research Tool Institute) have shown that all /normal/ relief angles can be increased to 8 degrees, which increases the life of the cutter two or three times. The life of the cutting tool can also be increased by widening the flat on the face of the tool to 0.5 millimeters when operating with a tool having a /normal/ side rake of from 8 to 20 degrees and a depth of cut from 0.5 to 2 millimeters.

Moscow, Trud, 21 May 53

Kolesov's method of power cutting has been applied in planing operations at the Sverdlovsk Uralmash Plant. G. Tyurin and Vasiliy and Georgiy Yurochkin, who have worked interchangeably on the same planing machine for 17 years, developed a special tool for this purpose. Having changed the shape of ordinary normal finishing tools, they used the tools with a depth of cut of 2 to 4 millimeters, feed from 6 to 10 millimeters, and a cutting speed of 10 meters per minute. In machining steel 35 under these conditions, they obtained a surface finish of the fourth class. To obtain a better surface finish, the Stakhanovites decrease the depth of cut to 0.2-0.5 millimeter.

In finish planing very wide surfaces (up to 4,000 millimeters) of steel parts, the life of high-speed-steel tools is not sufficient to machine such a surface completely in one pass. This necessitates stopping the machine tool and regrinding the tool. As a result, traces are left on the surface. To avoid this condition, the Stakhanovites use wide tools with T5K10 hard-alloy tips for finish passes on large planing machines.

In using the wide hard-alloy tools, the Stakhanovites machine with a feed of up to 6 millimeters per double stroke at a cutting speed of 7-10 meters per minute and a depth of cut of 0.1-0.3 millimeter.

Moscow, Moskovskiy Komsomolets, 23 May 53

At the Moscow Krasnyy Proletariy Plant, 24 persons have studied Kolesov's method; 2,300 cutting tools of his design have been manufactured and put into operation.

It has been calculated that the average increase in labor productivity, in operations converted to machining with increased feeds, has increased 20.7 percent in machine shop No 1, and 19.8 percent in machine shop No 2.

The Ministry of Machine Building USSR has organized an interplant Stakhanovite school at the Krasnyy Proletariy Plant. During a 7-day period, 24 workers from 15 enterprises of the ministry will become familiar with the work of the plant in high-speed machining with increased feeds.

Baku, Bakinskiy Rabochiy, 7 May 53

A shop of the Baku Machine Building Plant imeni Oktyabr'skaya Revolyutsiya is equipped with a large number of DIP-200 lathes. It was found that Kolesov's power method of cutting can be successfully used on these machine tools.

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